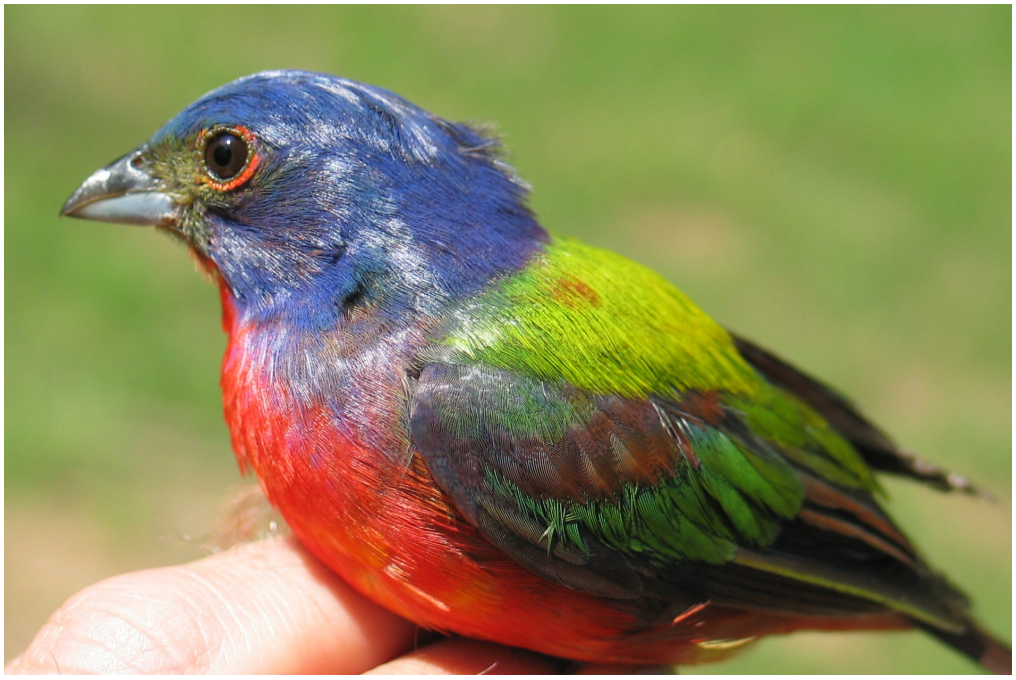
Draft Report

Monitoring **A**vian **P**roductivity and **S**urvivorship on Fort Sill

for Summer 2008

Contract # W9124L-08-P-0078



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EXECUTIVE SUMMARY

Least Flycatcher

The Natural Resources and Enforcement Branch, Environmental Quality Division, Directorate of Public Works at Ft. Sill contracted the Oklahoma Biological Survey (OBS) to implement a standardized avian monitoring protocol in May 2008. Using the MAPS protocol the OBS captured and marked birds at two stations on Fort Sill; Geronimo Hill (GEHI) and West Cache Creek (WCCR). This report contains results of netting operations at these sites between 22 May and 11 August in 2008. Both netting stations were operated on 8 days during 2008. Netting dates corresponded to time periods 3 through 10 as prescribed by the MAPS protocol for stations in Oklahoma's latitudinal band. On each of the sampling days, OBS operated 10 mist nets.

Total sampling effort was 960 net hours (= 1 net open for 1 hour), which yielded 223 captures of 22 species. Of these captures 165 were banded with individually numbered aluminum bands, 46 were recaptures of birds banded previously, and 13 birds were released (e.g., hummingbirds) or escaped without being banded. Each captured bird was identified to species, aged, sexed, measured, weighed, banded with individually number bands, and released. The most common year-around residents were: Northern Cardinals (n=16 new captures, 3 recaptures), Carolina Wrens (n = 18 new captures and 13 recaptures), and Blue Gray

Gnatcatchers (n = 23 new captures and 5 recaptures). The most common migrant birds were Painted buntings (n = 21 new captures and 5 recaptures) Indigo Buntings (n = 16 new captures, 11 recaptures), and White-eyed Vireos (n = 13 new captures and 5 recaptures). All recaptured birds had been originally captured and banded by OBS at Ft. Sill during this project period, during summer of 2004 to 2007.

INTRODUCTION

The MAPS Program -- The Monitoring Avian Productivity and Survivorship (MAPS) program began in 1989 with 16 bird-banding stations. Currently there are more than 500 stations dispersed across North America. Department of Defense is a primary cooperating agency in the MAPS Program and provides funds for this program through the DoD Legacy Program (www.dodlegacy.org). In April 2004, Ft. Sill contracted (#W9124L-05-P-0154) the Oklahoma Biological Survey (OBS) to implement the Monitoring Avian Productivity and Survivorship (MAPS) protocol developed by the Institute for Bird Population Studies (www.birdpop.org ; DeSante and Burton 1994). Two MAPS stations were initiated on Fort Sill in May 2004, which is in the South-Central region of the MAPS Network. There are relatively few MAPS stations in this region and there is only one other MAPS station currently in Operation in Oklahoma. One MAPS site had previously been established on Fort Sill by Roedel et al. (1994). Preliminary reconnaissance and autumn banding

Inidgo Bunting Nest

in 2003 indicated that the site used in 1994, at Geronimo Hill on East Range, remained one of the best location for a MAPS station. An Additional MAPS station was located on West Cache Creek on Quanah Range

Location of the MAPS site—**GERONIMO HILL -** The sample site is near the Beef Creek and Bailtso South Cemeteries along Beef Creek in Compartment A1. (34°41'N, 98°22'W; Figure 1). The site retains the name Geronimo Hill (GEHI) that was given to the site in 1994 and approved by the Institute for Bird Populations in September 1993 (Roedel et al 1994). The vegetation at the site is intermingled mature deciduous riparian forest and grassland and is bordered by alfalfa fields. This mix of habitat types is typical of the vegetation of the region and provided the opportunity to monitor the dominant breeding birds of the region. In addition the Geronimo Hill area is not used for military training, making access more reliable and allowing sampling in regularly scheduled intervals. For these reasons OBS re-established the Geronimo Hill banding site in autumn 2004.

Indigo Bunting

WEST CACHE CREEK – This MAPS site is located on the north side of West Cache Creek (WCCR) in compartment L4 (34°39'N, 98°39'W; Figure 2) and is west of the south boundary low-water crossing of West Cache Creek. The habitat is a narrow band of riparian woodland that is dominated by mixed deciduous tree species with Johnson Grass, Fish-on-a-pole grass, and Poison Ivy as primary

understory components. The forest structure of this site is less continuous and of smaller stature than found at Geronimo Hill. All of the nets were placed within 100 meters of West Cache Creek.

METHODS

Establishment and Timing of Banding Station Operation- Fort Sill is within the latitudinal band where the MAPS protocol requires that station operation begin in Period 3 (May 21-30) (Desante et al. 2004). The OBS established net lanes and placed netting equipment at the two sites in mid May of each year. Procedures used to trap, age, sex, mark, and identify birds were those of the MAPS program and are detailed in the Maps Procedures Manual. To summarize briefly, we re-established 10 net lanes to sample an area of 20ha at Geronimo Hill and West Cache Creek (Figure 1 and 2). Net locations at Geronimo Hill were selected based on the original locations of nets used in 1994 (Roedel et al. 1994). At West Cache Creek Net locations were selected to reflect the riparian nature of the area and to allow net checks on a 20-minute rotation. For future reference, UTM coordinates of the 10 net sites are provided in Tables 8 and 9.

As prescribed by the MAPS protocol 10 12-m nets were open from dawn for 6 hours on each day of operation. All nets used were 4-tier, 12 m long, 2.6 m tall, made of nylon-denier with 32mm

mesh. Consequently, total effort ranged from 60 to 70 net hours per day. OBS arrived on site at about 530 to have all nets open by 700. Nets were typically closed at 1200. Each of the 10 net lanes was operated for approximately the same number of hours throughout the fall (Tables 1 through 4). To standardize comparisons, we present most result with reference to net hours of effort. One net hour is equal to one 12 m long mist-net that is open for 1 hour.

In 2008 the first day of netting was 22 May and the last day was 11 August. Netting was conducted on 8 days at each site during 2008 and netting days were spaced so that one fell within each of the 8, 10-day periods as is required for MAPS Stations at Oklahoma's latitude. These sampling days correspond to periods 3 through 10 of the MAPS protocol (DeSante et al. 2004)

Banding Protocol – Nets were checked every 20 to 30 minutes from the time they were opened until close. Each captured bird was removed from the net and placed in a cloth bag with a drawstring tie and carried to the banding table, which was centrally located in: the Bailtso Cemetery parking lot at Geronimo Hill, or on the compartment road at West Cache Creek. At the banding table each bird was identified to species and banded with a uniquely number aluminum bad (Table 5). Once birds were banded, they were examined for characteristics that are useful in determining age and sex class. Our

Brown-headed Cowbird

determinations followed those of Pyle (1997) and USFWS (1991). To determine age class we relied heavily on degree of skull ossification in most species. Other useful characteristics included feather wear and molt patterns. For most species age classes were recorded as hatching year (MAPS Code 2), after Hatching Year (MAPS Code = 1) or Unknown (MAPS Code = 0). For determining sex of birds we primarily relied on plumage color, bill color and eye color in most species. Recorded sex classes were male (M), female (F), or unknown (U). Once age and sex criteria had been examined we measured the birds' wing chord (unflattened). This measurement followed the conventions of Ralph et al (1993). Once birds were measured the amount of fat present in the furcular groove was scored from 0 to 6 (MAPS manual). Birds were then placed in a weighing cone and their mass was determined with an electronic balance to the nearest 0.1g. The balance was calibrated against a know weight (200g) several times every day. After weighing, birds were released. Typical processing of a bird required 10 minutes. The majority of this time was spent examining molt patterns, which can provide important confirmation of age and sex class determinations. Data on measurements and mass of birds is presented in Appendix 1. Data were recorded on standard MAPS banding sheets.

Least Flycatcher wing

Data collected during banding were entered into standardized electronic formats of both the Bird Banding Laboratory (Band Manager

Software) and for the MAPS Network (MAPSPROG software). These data have been submitted to the MAPS Program office of the Institute for Bird Populations.

RESULTS AND DISCUSSION

Data collected in 2008--A total of 223 different individuals were captured and 165 of these were marked with unique numbered bands. This is double the number captured at these sites in 2007. Six different band sizes were used in banding captured birds (Table 3). Most of these birds (n=128) were captured at West Cache Creek while fewer were captured at Geronimo Hill (n = 95). In total, these individuals comprised 22 species captured in 960 net hours of effort. Another 13 birds were captured but were released of escaped before being banded (Table 6, Figures 3 and 4). For 6 species (Carolina Chickadee, Carolina Wren, Blue-gray Gnatcatcher, Indigo Buntings, and Northern Cardinal), we caught at least 5 new individuals at each of the MAPS Stations. These 4 species comprised 41% and 58% of newly banded birds at West Cache Creek and Geronimo Hill, respectively. There were some species that were only common at one of the two MAPS sites. Specifically, there were 18 Painted Buntings and 11 White-eyed Vireos

Female Painted Bunting

Captured at West Cache creek, but only 3 and 2 individuals of these species, respectively, were captured at Geronimo Hill.

Of the 165 different new individual birds captured in summer 2008, 16 (10%) were recaptured one time. 9 birds were recaptured more than once. Recaptures were divided among 8 species. The most often recaptured species were Carolina Wrens (n = 13), and Indigo Buntings (n = 11). No other species had more than 5 recaptures. Of the 106 birds captured in 2007, 20 (19%) were recaptured in the summer of 2008.

Capture rates varied substantially from week to week (Figure 5) and among nets (Figure 6). Total captures ranged from a low of 5 birds on 22 May at Geronimo Hill to A high of 23 birds on May 23rd at West Cache Creek. Total captures at individual nets ranged from a low of 3 at net 3 at Geronimo Hill to a high of 26 birds at net 10 at West Cache (Creek Figure 7). Finally, there did not appear to be any consistent pattern between the number of captures and time of day.

RECOMMENDATIONS: MANAGEMENT, RESEARCH, AND MONITORING

Continued monitoring of the Ft. Sill MAPS station is a high priority because there are few such stations within the south central region of the MAPS network. Most of these are in Texas (27) with a few in Missouri (6) and Kansas (8). Interestingly at most locations in Texas and Kansas it appears that a single operator (e.g. Ft. Riley and Ft.

Hood have multiple MAPS stations in operation). In contrast, there was only one station in Arkansas, two in Louisiana and two in Oklahoma. The Oklahoma sites are in the far eastern part of the state (Wagoner County) and few of the Texas or Kansas stations are in the western portion of the state. Therefore the Ft. Sill station has the potential to help fill a geographical void in the MAPS Network.

Understanding the survivorship of birds and its relationship to military land uses requires a commitment over a multi-year time frame. Only through this commitment can information of the survivorship and productivity of breeding birds be accurately quantified and used to guide natural resource management policy. Given the Department of Defense's national level support of this program, maintaining a MAPS station at Ft. Sill over the ensuing years is an important monitoring objective.

ACKNOWLEDGMENTS

Diane Landoll, Adam Fudickar, and Lauren Wilkerson helped with fieldwork during this project.

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Table 1. 2008 summary of mist-netting effort at Geronimo Hill banding station, Fort Sill, Oklahoma

Date	Nets Opened	Mean Opening time	Mean Closing time	Net-hours
22-May-08	1-10	0700	1300	60
14-June-08	1-10	0600	1200	60
21-June-08	1-10	0600	1200	60
26-June-08	1-10	0600	1200	60
01-July-08	1-10	0600	1200	60
18-July-08	1-10	0600	1200	60
22-July-08	1-10	0600	1200	60
10-Aug-08	1-10	0600	1200	60

Table 2. 2008 summary of mist-netting effort at West Cache Creek banding station, Fort Sill, Oklahoma

Date	Nets Opened	Mean Opening time	Mean Closing time	Net-hours
23-May-08	1-10	0600	1200	60
15-June-08	1-10	0600	1200	60
22-June-08	1-10	0600	1200	60
27-June-08	1-10	0600	1200	60
02-July-08	1-10	0600	1200	60
19-July-08	1-10	0600	1200	60
23-July-08	1-10	0600	1200	60
11-Aug-08	1-10	0600	1200	60

Table 3. Band sizes and numbers used at Geronimo Hill and West Cache Creek MAPS stations, Fort Sill, Oklahoma during Summer 2008.

Band size	Beginning number	End number
0A	2310-27930	2310-27970
0A	2310-27801	2310-27801
0	2350-09638	2350-09656
1	2221-50414	2221-50478
1B	1901-26582	1901-26600
1B	2281-18701	2281-18713
1A	1801-96910	1801-96910
2	752-69750	752-69771

Table 4. Bird Species captured in mist nets (Cap), number of new bands applied (New) , recaptures (Re) and unbanded birds (Un) during Summer 2008 at Geronimo Hill and West Cache Creek MAPS stations, Fort Sill, Oklahoma.

				West Cache Creek				Geronimo Hill			
No.	Common name	Scientific name	Code	Cap[a]	New	Re	Un	Cap[a]	New	Re	Un
1	Yellow-billed Cuckoo	*Coccyzus americanus*	YBCU	1	1	0	0	0	0	0	0
2	Black-chinned Hummingbird	*Archilocus colubris*	BCHU	4	0	0	4	1	0	0	1
3	Red-bellied Woodpecker	*Melanerpes carolinus*	RBWO	2	2	0	0	0	0	0	0
4	Downy Woodpecker	*Picoides pubescens*	DOWO	1	1	0	0	1	1	0	0
5	Hairy Woodpecker	*Picoides borealis*	HAWO	2	2	0	0	1	1	0	0
6	Great Crested Flycatcher	*Myiarchus crinitus*	GCFL	1	1	0	0	1	1	0	0
7	Least Flycatcher	*Empidonax minimus*	LEFL	2	2	0	0	0	0	0	0
8	Empidonax Species	*Empidonax sp.*	EMSP	1	1	0	0	0	0	0	0
9	Red- eyed Vireo	*Vireo gilvus*	REVI	5	4	1	0	1	1	0	0
10	White-eyed Vireo	*Vireo griseus*	WEVI	14	11	3	0	4	2	2	0
11	Carolina Chickadee	*Poecile carolinensis*	CACH	6	5	0	1	11	9	2	0
12	Tufted Titmouse	*Baeolophus bicolor*	ETTI	1	1	0	0	5	4	1	0
13	Carolina Wren	*Thryomanes ludovicanus*	CARW	8	5	1	2	25	13	12	0
14	Blue-gray Gnatcatcher	*Polioptila caerulea*	BGGN	18	13	5	0	10	10	0	0
15	Swainson's Thrush	*Catharus ustulatus*	SWTH	2	2	0	0	0	0	0	0
16	Black-and-white Warbler	*Mniotilta varia*	BAWW	5	5	0	0	2	2	0	0
17	Louisiana Waterthrush	*Seriurus motacilla*	LOWA	4	4	0	0	3	3	0	0
18	Wilson's Warbler	*Wilsonia pusilla*	WIWA	2	2	0	0	0	0	0	0
19	Summer Tanager	*Piranga rubra*	SUTA	2	2	0	0	0	0	0	0
20	Indigo Bunting	*Passerina cyanea*	INBU	12	7	5	0	15	9	6	0
21	Painted Bunting	*Passerina ciris*	PABU	21	18	3	0	5	3	2	0
22	Northern Cardinal	*Cardinalis cardinalis*	NOCA	14	11	1	2	10	5	2	3
	Total			128	100	19	9	95	64	27	4

[a] Cap = total captures; new = new bands placed on birds; re = recaptures; un = unbanded.

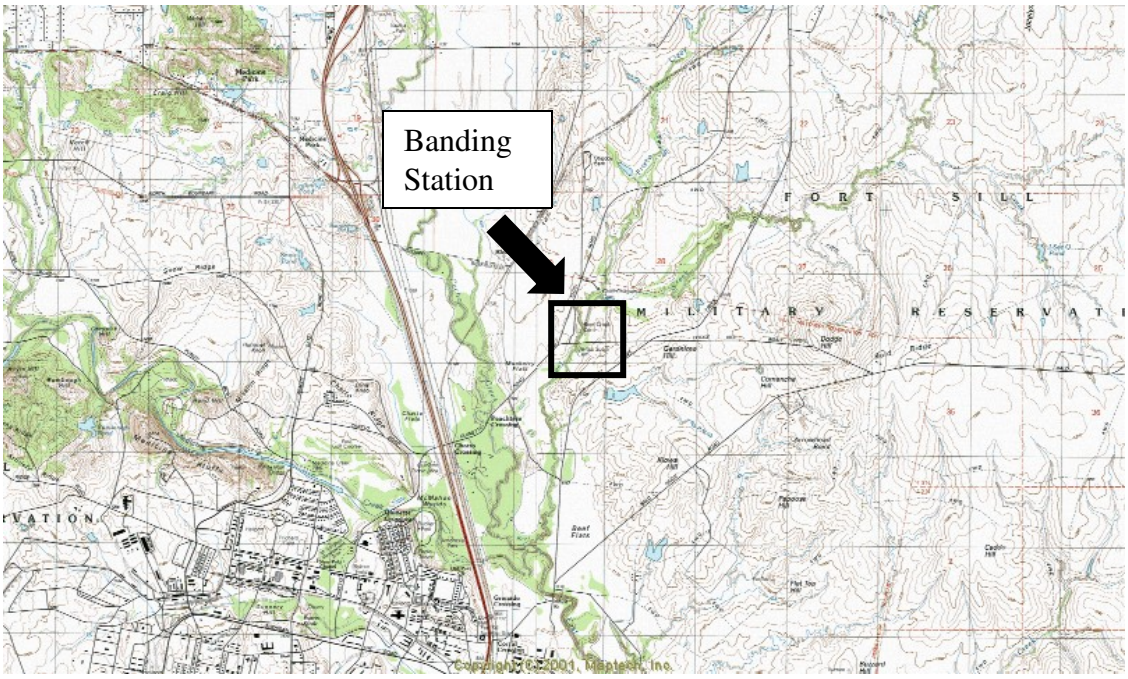
Table 5 . UTM coordinates of net lanes at the Geronimo Hill MAPS station Ft. Sill Oklahoma. Coordinates reflect the 1927 North American Datum.

		Universal Transverse Mercator	
Net	ZONE	Easting	Northing
1	14S	557368	3838915
2	14S	557801	3839313
3	14S	557766	3839267
4	14S	557720	3839156
5	14S	557657	3839135
6	14S	557609	3839083
7	14S	557527	3838917
8	14S	557504	3838890
9	14S	557482	3838853
10	14S	557438	3838935

Table 6. UTM coordinates of net lanes at the West Cache Creek MAPS station Ft. Sill Oklahoma. Coordinates reflect the 1927 North American Datum.

		Universal Transverse Mercator	
Net	ZONE	Easting	Northing
1	14S	0532041	3834120
2	14S	0532017	3834136
3	14S	0532016	3834161
4	14S	0531988	3834159
5	14S	0531973	3834151
6	14S	0531966	3834176
7	14S	0531948	3834161
8	14S	0531916	3834185
9	14S	0531882	3834189
10	14S	0531916	3834160

A.


Banding
Station
F O R T S I L L
M I L I T A R Y
R E S E R V A T I

B.

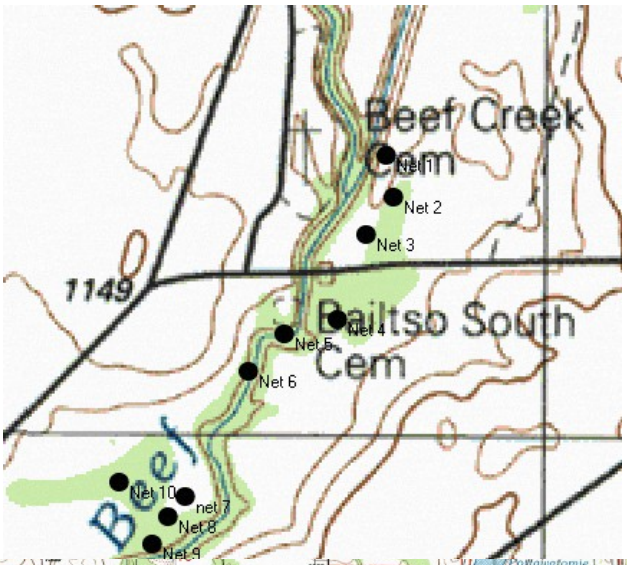
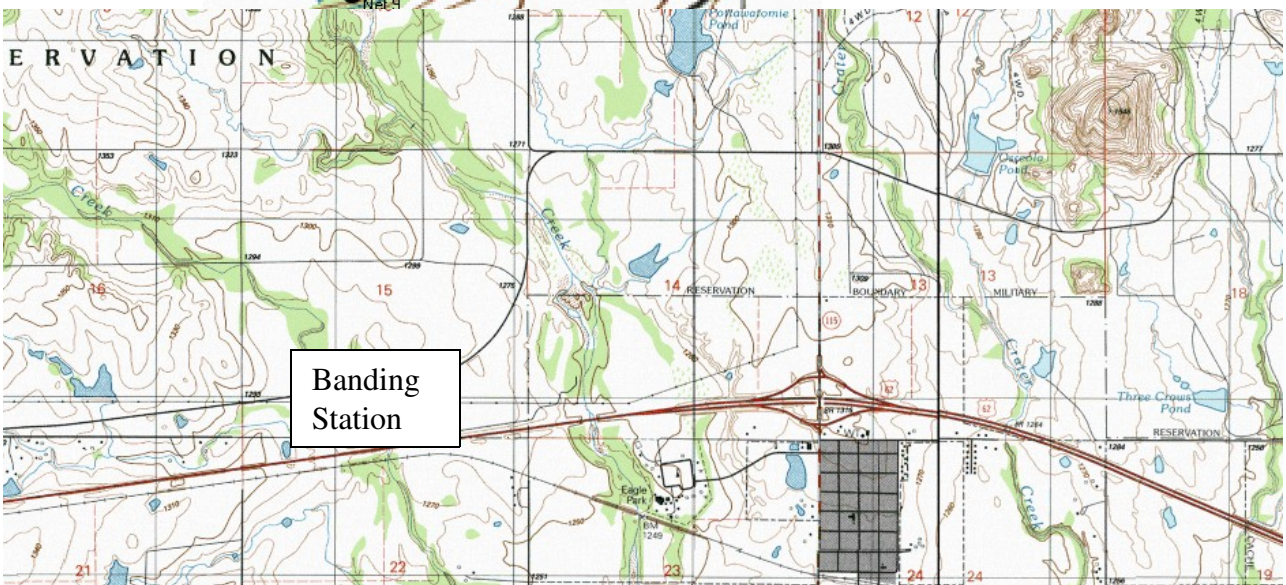

Beef Creek
Cem
Net 1
Net 2
Net 3
1149
Baltso South
Cem
Net 4
Net 5
Net 6
Beef
Net 10
net 7
Net 8
Net 9

Figure 1.

A.


E R V A T I O N
Banding
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RESERVATION
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B.

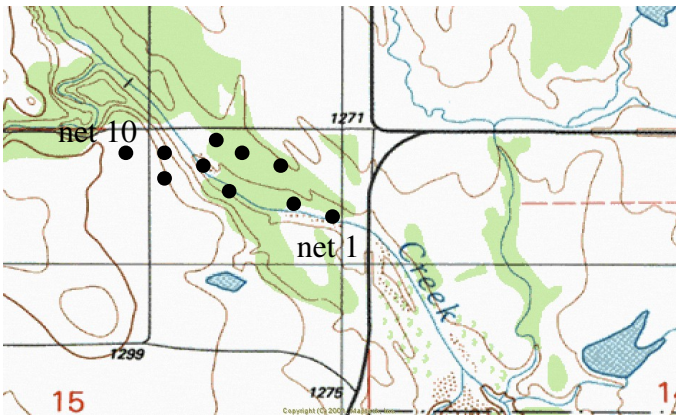

Figure 2. Location of the West Cache Creek MAPS Site within Ft. Sill (A) and the locations of the 10 nets (black circles) within the West Cache Creek Banding site (B). See Table 6 for UTM coordinates of nets.

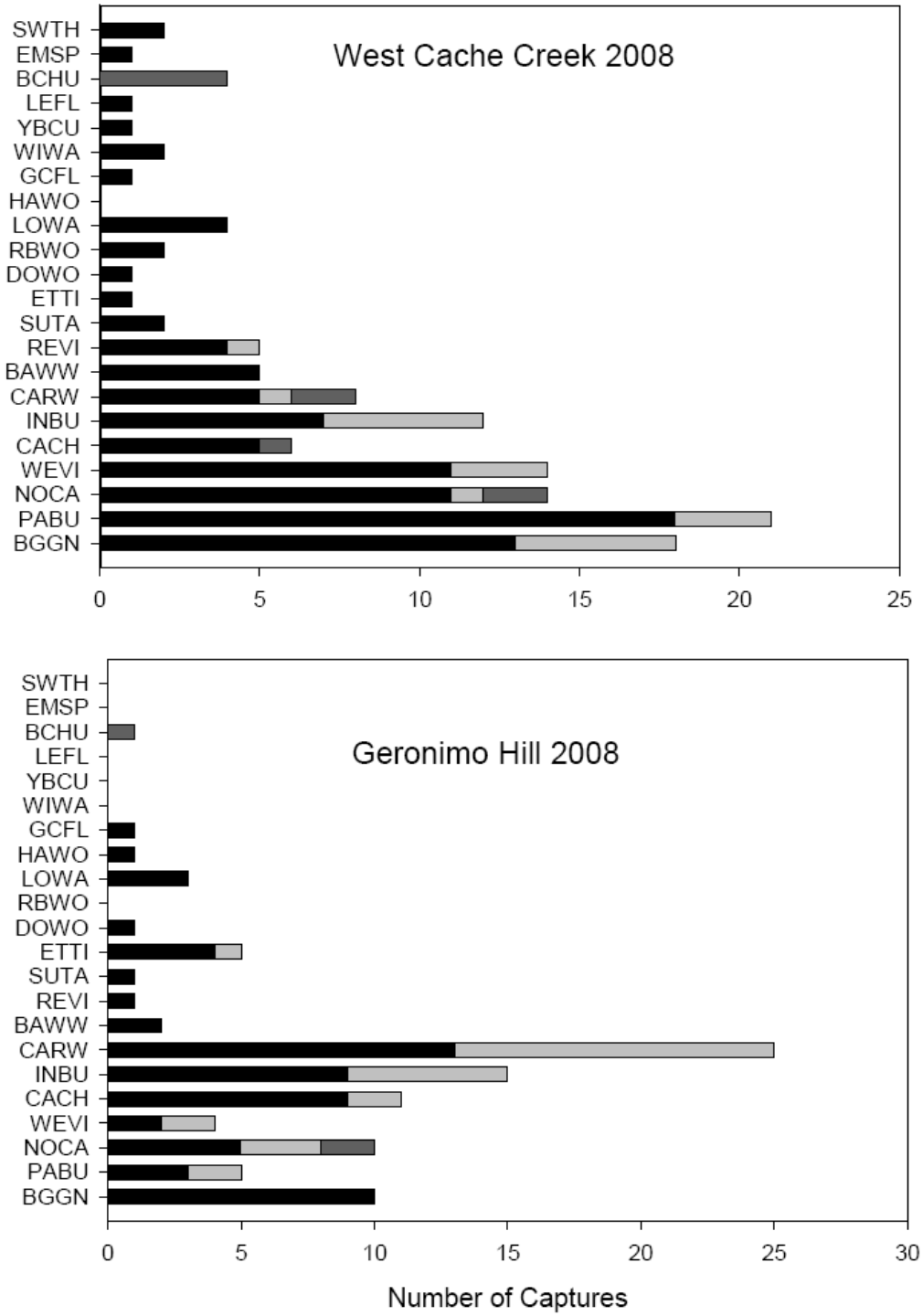

Figure 3. Number of captures by Species at Fort Sill, OK MAPS stations in 2008. Four letter species codes are provided in Table 6.

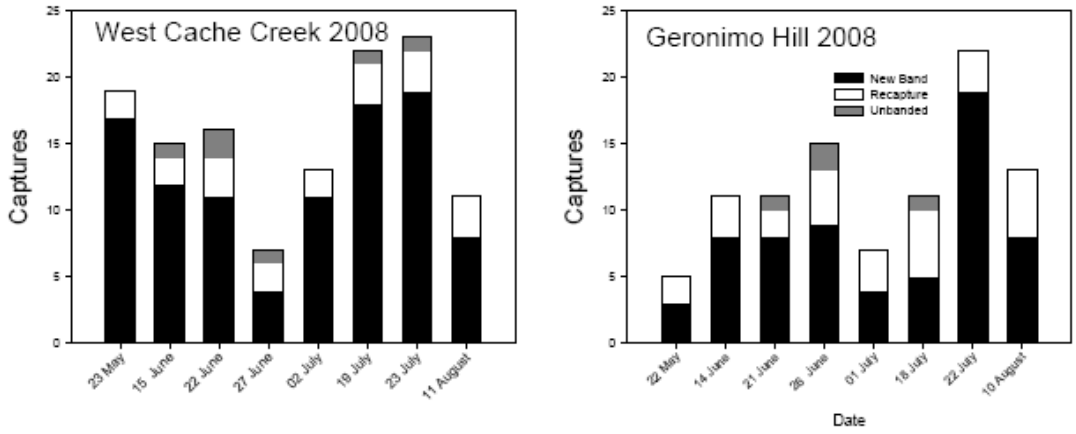

Fig. 4. Captures by session in 2004 and 2005 showing number of banded birds, recaptures and unbanded birds (does not account for unequal net hours for some sessions).

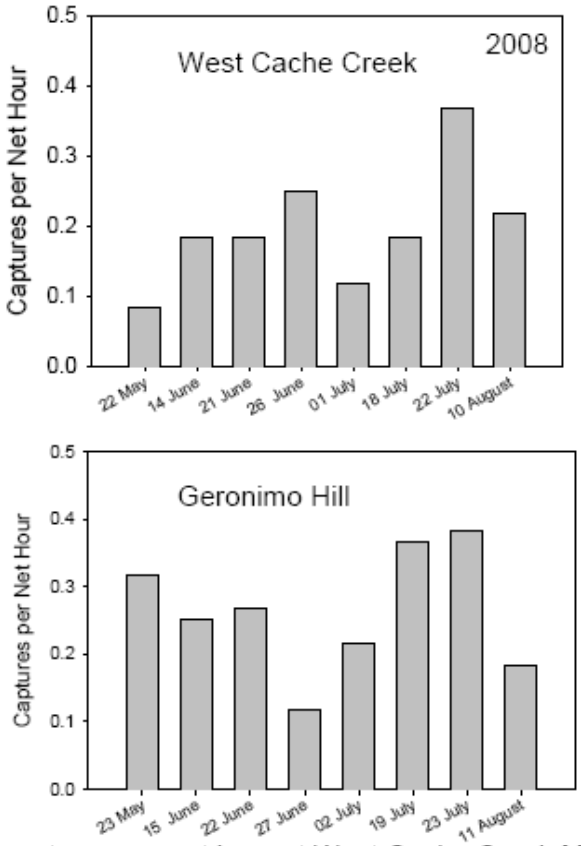

Figure 5. Number of captures per net hour at West Cache Creek MAPS Stations in 2008

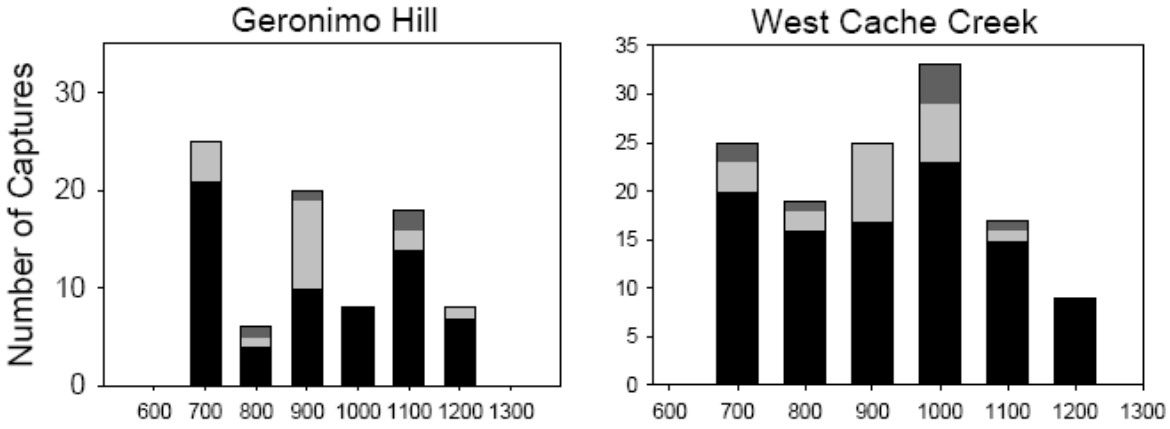

Fig. 6. Total captures in each 1-h time period in summer 2008 at two MAPS stations, Ft. Sill, OK.

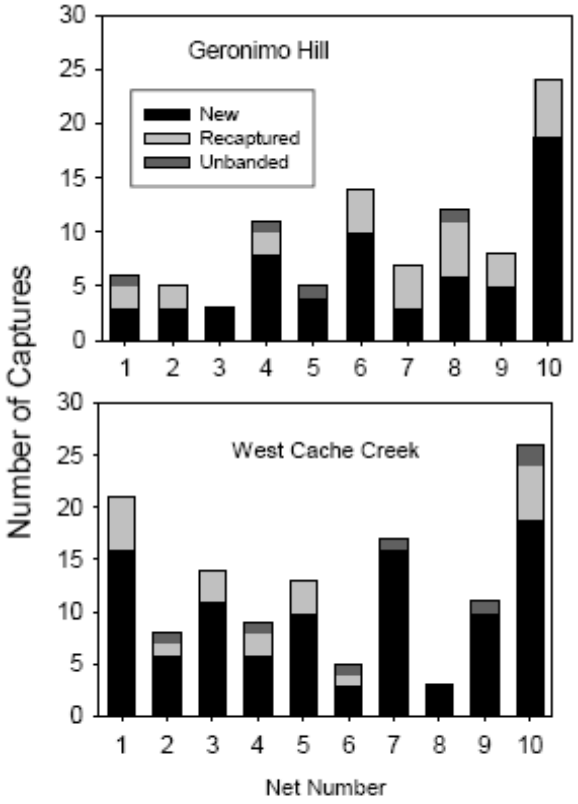

Fig. 7. Total captures in each net during summer 2008 at Two MAPS stations, Ft. Sill, OK.